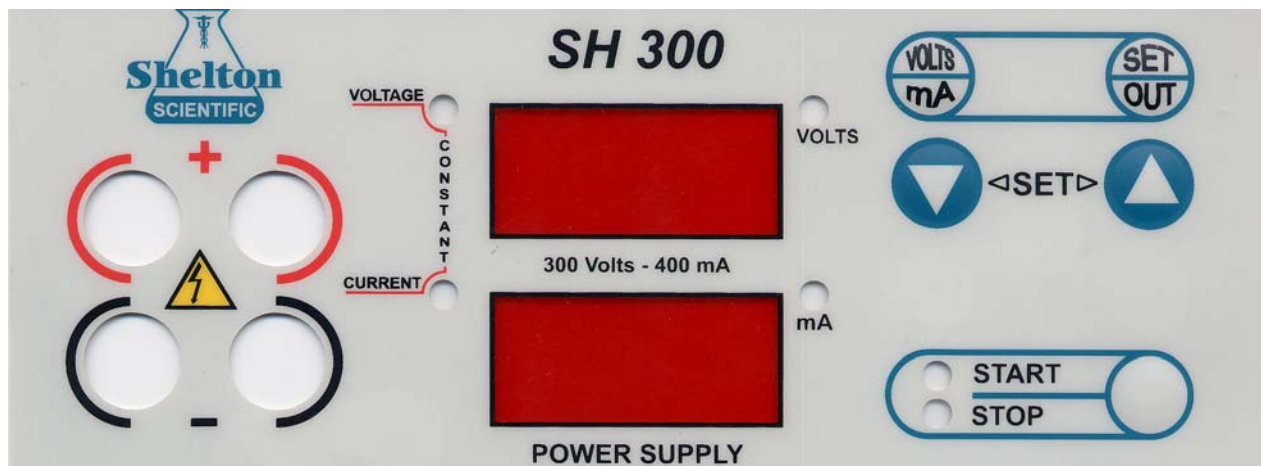


# USER'S MANUAL

## ELECTROPHORESIS POWER SUPPLY SH-300



### WARNING

THE ELECTROPHORESIS POWER SUPPLIES ARE CAPABLE OF DELIVERING POTENTIALLY LETHAL VOLTAGE AND IS TO BE OPERATED ONLY BY QUALIFIED TECHNICALLY TRAINED PERSONNEL.  
PLEASE READ THE ENTIRE OPERATOR'S MANUAL THOROUGHLY BEFORE OPERATING THIS UNIT.

TAKE CARE AS THE MODE OF OPERATION OF THIS UNIT IS CONTINUOUS

PLEASE RETAIN ALL PACKAGING  
MATERIALS UNTIL THE WARRANTY  
PERIOD HAS EXPIRED

# Description

## **Microprocessor controlled switching Power Supplies**

- The **IBI-Shelton** SCIENTIFIC power supplies are CE marked and complies with the following requirements : EN 61326-1 – Edition 1997, FCC part 15 Class B – Edition 1995 - EMC directive 89/336/CEE. They are certified and manufactured according to the IEC 1010-1 standard and test regulation.
- These power supplies are equipped with an automatic restart system in case of mains failure. When the power returns, an audible alarm sounds for 10 seconds and the power automatically restarts with the previous set values. If during the power failure the electrophoresis unit is disconnected from the power supply, the alarm still sounds when the mains supply returns. Because no load is connected the power supply it will immediately shut-down and the output will be set to zero.
- Direct reading of the programmed set values and actual values before and during the cycle.
- Volt and mA adjustable during a cycle.
- Stabilisation and automatic crossover between the parameters according to the set limitation values and when output limits are reached. 2 Red LED(s) indicate the constant mode.
- 2 operating modes: constant voltage - constant current.
- Settings by tactile switches on moisture resistant membrane panel.
- Battery-backed memory feature "saves" last output set values in the event of a power failure or when the run is terminated and the unit is turned off.
- 2 red LED(s) display settings for output voltage and current.
- 2 recessed safety output jacks allow simultaneous operation of 2 electrophoresis units.
- Fault detection and 500µA current leakage detection, or no load automatically shuts down output and indicates the fault by the "STOP" LED blinking and an audible alarm.

# Safety precautions

***THESE POWER SUPPLIES ARE CAPABLE OF DELIVERING POTENTIALLY DANGEROUS VOLTAGE AND ARE TO BE OPERATED ONLY BY QUALIFIED TECHNICALLY TRAINED PERSONNEL. PLEASE READ THE ENTIRE OPERATOR'S MANUAL THOROUGHLY BEFORE OPERATING THIS UNIT.***

***TAKE CARE AS THE MODE OF OPERATION OF THE UNIT IS CONTINUOUS***

If the power supply is used in a manner not specified by **IBI-Shelton** SCIENTIFIC, then the protection systems of the equipment may be impaired.

For additional information, please call the **IBI-Shelton** SCIENTIFIC or your distributor's Technical Resources Department.

Never attempt to remove the outer casing or make any repairs to the unit.

Contact **IBI-Shelton** SCIENTIFIC immediately if there is need for repair or a servicing need should arise.

***The unit must be grounded. Use only the line cord supplied with the unit for safe operation. The use of a line cord other than this or one supplied by IBI-Shelton SCIENTIFIC may result in user hazard.***

For UK users, check the mains plug of the line cord to make sure it is equipped with a protection fuse not exceeding 3 A. Connect the line cord directly into a properly rated, 210/250VAC 50/60Hz or 105/125VAC 50/60Hz three pins wall outlet.

***For connection between the power supply and the electrophoresis equipment, use only safety output power cords equipped with Black and Red recessed plugs.***

Check the power cords and the black and red recessed safety jacks periodically to make sure that they are in good condition. Do not use cords which are cracked, nicked or in otherwise poor condition. Always make all connections between the power supply and the electrophoresis equipment prior to start-up of the output. Never place any objects other than high voltage connectors rated to 1000V into the output jacks. Site the unit such that the rear panel has at least 8" [20cm] of clearance to provide for adequate unit ventilation.

***The power supply must only be connected to electrophoresis equipment manufactured with built-in safety protected male plugs.***

***It is also recommended to use electrophoresis equipment that can only be connected when the protection lids are closed.***

# Specifications

Input supply voltage fluctuations not to exceed  $\pm 10\%$  of the normal voltage

Input supply, 110V model :	90 - 130V; 50 - 60Hz; 2A fuses
Input supply, 220V model :	180 - 260V; 50 - 60Hz; 8A fuses
Fuse value in the input plug:	3A
Rated input power/current	400VAC
Volt – Current range	1 - 300V ; 1V step
Power	1 - 400mA; 1mA step 0,6 - 120W
Mode of operation	Continuous
Switching frequency	23kHz
Output regulation stability	$\pm 0,2\%$ FS $\pm \frac{1}{2}$ digit
Minimum output	1V; 15 $\mu$ A; 0,6W
Value display accuracy	$\pm 0,2$ FS $\pm \frac{1}{2}$ digit
Input failure during the run:	Audible alarm and automatic restart with previously set values
Fault detection	Output supply stop, audible alarm STOP LED blinking
Fault status	Output to ground leakage Output open circuit Output short circuit No regulation (Overheating, power circuit fault)
Earth leakage detection level	500 $\mu$ A
Output to earth impedance	10M $\Omega$ min bypassed by 1nF max
Size	24cm x 17cm x 11cm (DxWxH)
Weight	1,8kg
Environmental conditions	Indoor use, Altitude up to 2000m Temperature 10°C - 40°C

Maximum relative RH 80% for temperature up to 31°C decreasing linearly to 50% RH at 40°C.

## **CLEANING**

The power supply may be cleaned as required when the main supply is isolated.

Cleaning should be carried out with a cloth moistened with water or with tissues impregnated with 70% Isopropyl alcohol. No other cleaning solutions should be used.

## **MAINTENANCE**

There are no internal operator serviceable parts in this power supply.

If the power supply should fail, the unit must be returned to the authorized Service Center.

See troubleshooting guide for help.

## **SHIPMENT**

When shipment or transport of the power supply is required, use the packaging supplied with the unit. Store the unit in the packaging, in a dry area.

# Operation

Note: The last set output values are memorised.

## A - Unit power up and immediat starting

1. Connect the AC line cord to a grounded, 3-prong wall outlet.
2. Connect the power supply to an electrophoresis device using the power cords supplied with that unit.
3. To turn the power supply on, press the main power switch located on the rear panel. The STOP LED (**#10**) illuminates, and the output display will read zeros.
4. To display and check last set values, depress SET/OUT switch (**#1**)  
*As soon as this switch is activated, the output display shows the last output set values*
5. If the Volts and mA set values are correct, press START/STOP switch (**#9**) for starting the run. The green LED (**#10**) illuminates.
6. The actual values are immediately displayed. According settings and gel resistance, one of the constant mode LED(s) will be alighted :  
(**#5**) for constant voltage – (**#6**) for constant current
7. When separation is terminated, press START/STOP (**#9**) to stop the run
8. Turn off the power supply by using the main power switch on the rear panel

## B - Adjusting output set values when unit is on STOP mode

1. Depress the SET/OUT switch (**#1**)  
*As soon as this switch is activated, the output display shows the last output set values*
2. The Volts LED (**#3**) is blinking at first. Increase or decrease voltage by the help of the two SET switches (**#8**)
3. Depress VOLTS/mA switch (**#2**) in order to select mA. The mA LED (**#4**) is now blinking. Increase or decrease current by the help of the two SET switches (**#8**)
4. Press START/STOP switch (**#9**) for starting the run
5. The actual values are immediately displayed. According to the settings and gel resistance, one of the constant mode LED(s) will be alighted:  
(**#5**) for constant voltage - (**#6**) for constant current
6. When electrophoresis is terminated, press START/STOP switch (**#9**) to stop the run

7. Turn off the power supply by using the main power switch located on the rear panel

Maximum output values are as follows:

- |  |
|--|
| for 300V - maximum current 400 mA (120W) |
| for 400mA - maximum voltage 300V (120W)  |

## C – Adjusting output set values when unit is on START mode

1. While the unit is running, depress the SET/OUT switch (#1).  
*As soon as this switch is activated, the output display shows the last output set values.*
2. The Volts LED (#3) is blinking at first. Increase or decrease the voltage by the help of the two SET switches (#8).
3. Depress Volts/mA switch (#2) in order to select mA. The mA LED (#4) is now blinking. Increase or decrease the current by the help of the two SET switches (#8).
4. Press SET/OUT switch (#8) for displaying the new actual values
5. When electrophoresis is terminated, press START/STOP switch (#9) to stop the run.
6. Turn off the power supply by using the main power switch located on the rear panel

## D – FURTHER INSTRUCTIONS

1. To view the set values during the run, depress the SET/OUT switch. The display will show the set values as long as this switch is depressed. Once the SET/OUT switch is released, the display will show the output values for three seconds, and then switch back to displaying the actual output values.
2. It is possible to change the values during the run **without** depressing the STOP switch.
3. To change the output set values during the run or in STOP mode :
  - Depress the SET/OUT switch.
  - Select the parameter by depressing the Volts/mA switch.
  - The selected parameter is indicated by a corresponding blinking LED located on the right of each display.
  - Use the two SET switches until the appropriate output set value is reached.
  - After 3 seconds, the new actual output values are automatically displayed
  - To read immediately the new actual values, press SET/OUT switch.

4. In START status, when the SET/OUT switch is depressed, the Leds display the output set values during three seconds and then switch back to displaying the actual output values.
5. To establish the limiting (constant) mode for the particular experiment, set the controlling parameter to the output desired, and increase the other output set value until the appropriate mode LED (Constant Voltage or Constant Current) illuminates. These LED(s) are located on the left of the displays.
6. If the non-controlling output set values is reached during the course of the run, the power supply will automatically crossover to the new mode and control output relative to that mode. The appropriate mode LED (Constant Voltage or Constant Current) will illuminate.
7. If automatic crossover is desired during the run, adjust the output set value of the second controlling parameter to the maximum setting desired. When actual output relative to the second controlling parameter equals its output set value, the output will cross over from the first controlling parameter to the second.
8. When the run has been completed, depress the STOP switch to cease power output. Wait one minute before disconnecting the power cords from the gel unit.
9. Turn the main power switch off when the unit is not in use

## User's protection and safety

An audible alarm and STOP LED indicate a fault situation and cut off the power supply :

- Overload.
- Output to ground leakage
- Output open circuit
- Tank's lead(s) disconnected or defective.
- Output short circuit.

Press STOP to resume and look for the wrong situation.

Press START to run again.

### **IMPORTANT**

The power supply automatically restarts with respect to the set values when the power is operating again after a power failure or repetitive micro failures during a cycle. The STOP LED blinks for 10 seconds before operating again.



# **TROUBLESHOOTING GUIDE**

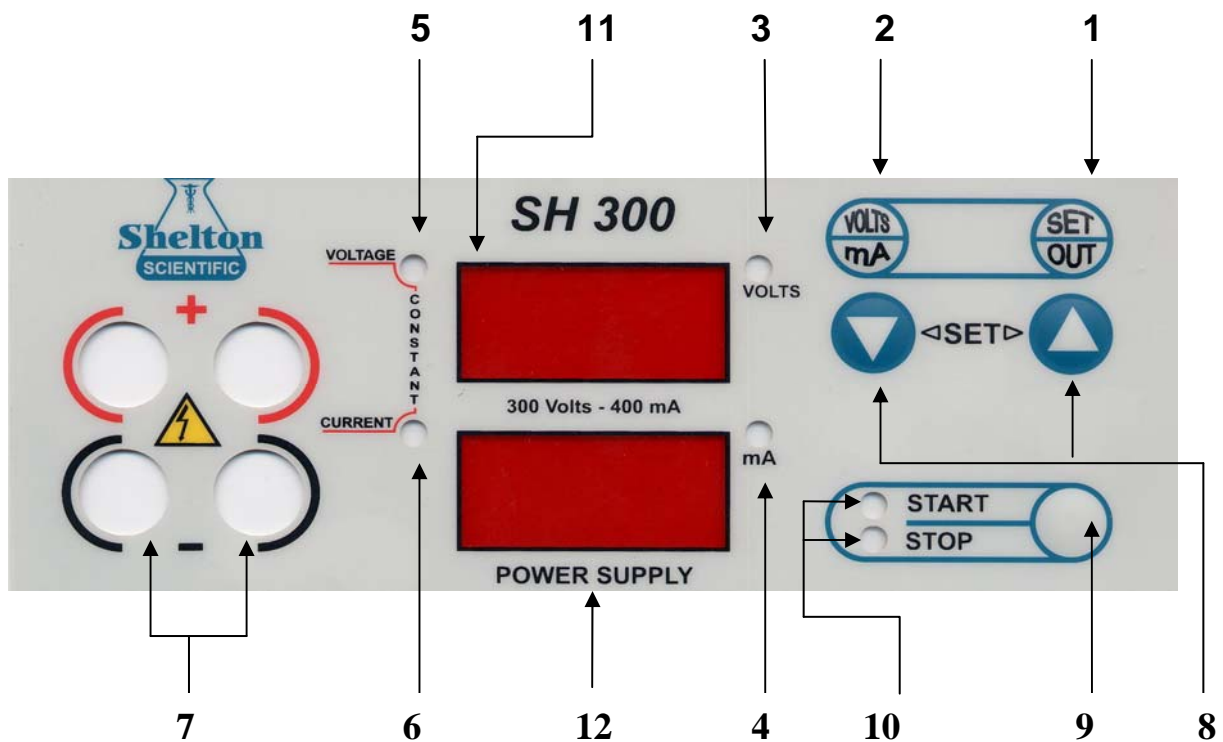
CONDITION	PROBABLE CAUSE	REMEDY
Display fails to illuminate when the POWER switch is put on.	Fuses have blown	<b>See Warning below</b>
The desired MODE is not flashing.	One of the other parameters is limiting output.	Increase the output set value of the parameter controlling output until the desired output mode is controlling.
Two different modes are blinking alternatively.	Settings for both parameters are too close to the actual output.	Increase the set value for the mode you do not wish to be limiting.
Settings switches are not working.	SET mode is not operating	Depress SET switch
Audible alarm at power up	Automatic restart is coming	Press STOP to stop this function The unit has been previously cut off by the power switch when running. Unit must always be stopped by the STOP switch prior to cut off by the power switch
Impossible to start the run, Unit is coming back on STOP mode with audible alarm	A fault situation avoid the START mode to operate	See “user’s protection and safety paragraph

## **WARNING**

**Never attempt to remove the outer casing or make any unit repairs.  
Contact IBI-Shelton SCIENTIFIC if the need for repair or servicing should arise**

**Should the power supply fail, DO NOT remove the outer case of the unit and attempt any repairs.**

**Contact IBI-Shelton SCIENTIFIC if the need for servicing the unit should arise.**



- 1 Tactile switch for the selection of the following modes :
  - OUT : Display of output values when the unit is running
  - SET : Display of preset values
- 2 Tactile switch for selection of parameter to set. Operating in SET mode
  - Volts : Voltage
  - mA : Current
- 3 Blinking only in SET mode: LED indicating that voltage value can be changed
- 4 Blinking only in SET mode: LED indicating that current value can be changed
- 5 LED indicating that voltage is the constant parameter during the run
- 6 LED indicating that current is the constant parameter during the run
- 7 Two recessed safety output jacks
- 8 Tactile switches for increasing/decreasing Volts and mA. Operating in SET mode
- 9 START/STOP switch
- 10 LED(s) indicating the START or STOP status
- 11 Display for Volts
- 12 Display for mA